

User & config info in
Hit List
*Salvage***First Hit**

Clear

Generate Collection

Print

Fwd Refs

Bkwd Refs

Generate OACS

Search Results - Record(s) 1 through 1 of 1 returned.☐ 1. Document ID: US 6289377 B1

L2: Entry 1 of 1

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DOCUMENT-IDENTIFIER: US 6289377 B1

TITLE: Dynamic network configuration of a one-way adapter using a proxy agent that communicates with a resource server through a configured return path adapter

Abstract Text (1):

A one-way adapter such as a cable modem is initialized to allow a personal computer to receive data from a computer network such as the Internet via a broadcast channel, while transmitting data upstream to the computer network via a telephone line. First, a two-way adapter such as a phone modem is initialized by establishing a telephone link with a terminal server of an Internet Service Provider telephone network. The terminal server obtains an IP address from a phone network address server, and assigns the IP address to the phone modem stack. Next, the cable modem stack sends out a request for session initialization to a cable modem driver. The request is processed by a packet processing relay agent (PPRA), and the IP address of the phone modem is inserted into the packet. The IP packet destination address is set to that of a cable network address server. A cable network address server receives the packet via an upstream telephone line and responds with IP address and configuration information for the relay agent address. The phone modem receives the response and passes it to the cable modem stack via the PPRA. The cable modem is thus initialized with IP address and configuration information and is ready to receive Internet data via a one-way RF channel.

Brief Summary Text (24):UDP--User Datagram Protocol;Brief Summary Text (27):

Existing cable television networks deliver digital television signals to users' homes via coaxial cable, or hybrid fiber and coaxial cable networks. Additionally, satellite distribution networks that transmit programs directly to a user's home have also gained increased popularity. The digital signals transmitted to the user provide high-fidelity video and audio. Other types of data can also be transmitted to the user, such as closed captioning data, stock data, weather reports and the like. This data may be modulated onto an entire television signal channel, or a portion of the television signal channel, such as the vertical blanking interval, and recovered at a decoder in the user's home.

Brief Summary Text (28):

Additionally, some cable networks provide an upstream communication path that allows a user to transmit signals to the headend, for example, to order pay-per-view programming, or to check on an account balance.

Brief Summary Text (29):

Furthermore, computer networks such as the Internet are growing rapidly in

popularity, particularly among the general public who use the Internet for entertainment, educational, and informational purposes, and to communicate with other users. A user typically accesses the Internet via a PC and a telephone modem via a conventional duplex telephone line to download graphics, text and even audio and video data from various remote servers. Users may also communicate real-time with one another by transmitting data from a sender's PC to the receiver's PC. Thus, data is transmitted to and from the PC via the two-way telephone modem.

Brief Summary Text (31):

Accordingly, the provision of Internet data services and the like on a cable or satellite network would be highly desirable due to the increased bandwidth available. Such an arrangement would greatly speed the response to the user's PC, while providing additional marketing opportunities for cable and satellite network operators.

Brief Summary Text (32):

However, the provision of an upstream path is not feasible for satellite or terrestrial broadcast networks, including UHF, MMDS and LMDS. Moreover, many cable television networks are not configured for upstream communications, or any such provisioning may be limited and not suitable for handling transmissions from a larger number of users. In particular, network operators may prefer to maintain the available upstream path for significant revenue-enhancing activities such as pay-per-view orders.

Brief Summary Text (36):

For ease of network operations and management, operators would like the one-way adapters to be configured dynamically with their IP address network configuration information.

Brief Summary Text (37):

The system should provide dynamic network configuration of a one-way adapter, such as a cable or satellite modem, that receives data from a computer network such as the Internet via a downstream broadcast channel of a cable or satellite television network, respectively. Such configuration provides IP addresses and configuration information for the duration of the Internet session. This address can be assigned to other modems when the user is not surfing.

Brief Summary Text (38):

Given that the adapter is one-way receive-only, and that the assignment of network configuration information requires a two-way send and receive communication link, the system should provide a proxy agent that facilitates the dynamic configuration of a one-way adapter and associated network services using a configured return path.

Brief Summary Text (42):

The present invention provides dynamic network configuration of a one-way adapter in a one-way communication system such as a cable television system or the like. The invention allows a personal computer, router/bridge or other device to receive data from a computer network such as the Internet via a broadcast channel of a cable, satellite or other terrestrial broadcast television network, while transmitting data upstream to the computer network via a telephone line. The invention thereby allows a user to quickly access and retrieve data from the computer network via a high bandwidth channel.

Brief Summary Text (48):

Generally, when a user wants to access (e.g., "surf") the Internet using a PC, a two phase connection process that is controlled by a connection manager application running on the PC occurs. First, a phone modem adapter is initialized, then a cable modem adapter is initialized.

Brief Summary Text (49):

A phone link is established with an ISP terminal server to obtain an IP address and network configuration information that is required for the phone modem adapter's TCP/IP stack. On phone modems, the PPP is used for link establishment, and the IP address and network configuration information is obtained using IPCP, which is a subset of PPP.

Brief Summary Text (50):

Once the PPP link establishment phase is completed, the address and network configuration information is provided by a phone network address management server to the terminal server. The terminal server provides the information to the phone modem stack using IPCP. At this point, the phone modem and the corresponding stack is fully initialized and is capable of two-way communication with the Internet using the IP address obtained by the above PPP process as the source IP address.

Brief Summary Text (51):

The next step in the connection process is the initialization of the cable modem adapter. DHCP is one possible method of dynamically configuring network configuration information. From a network's perspective, the cable modem needs to send out a request for IP address and network configuration parameters. However, since the cable modem adapter is a one-way receive only adapter, the request cannot be sent out over an RF broadcast channel. This is why the PPRA is needed. The cable modem stack sends the request for initialization information to the PPRA via the cable modem driver.

Brief Summary Text (54):

The DHCP address is assigned each time (e.g., session) the user wishes to connect to the Internet. Once connected, the user can surf any number of sites using the address assigned for the connection. When the user disconnects and the DHCP server is informed of the disconnect event, the server is free to reuse this address and assign it to any other client.

Brief Summary Text (58):

The cable network addresses are assigned from a different network than the ISP's network. The Internet server that the user is accessing responds to the cable network address assigned to the cable modem. All packets with destination addresses belonging to the cable network are routed from the Internet to an MSO router by normal IP routing and forwarding rules. Once at the MSO router, packets with destination addresses belonging to the cable modems are forwarded to a broadband network hub for communication to the cable modems.

Brief Summary Text (59):

Moreover, at session termination, when a user clicks on a disconnect session button on the PC screen or the like, the cable modem is first uninitialized. The DHCP client in the cable modem stack sends out a message to the cable network address server indicating that it is releasing the IP address. The DHCP server is now free to assign this address to any other cable modem. After the DHCP release message is sent out, the phone connection is closed by using the PPP to uninitialized the IP address associated with the phone modem stack, and then disconnecting the phone link.

Brief Summary Text (61):

The method includes the steps of: establishing a link between the two-way adapter and the service provider via the second communication path, e.g., in response to a user request to access the Internet, obtaining an address from the service provider, and communicating the address to the packet processing relay agent via the second communication path and the two-way adapter. A session initialization request packet is provided from the one-way adapter to the packet processing relay agent.

Brief Summary Text (63):

The network address server responds to the packet communicated thereto by communicating address configuration information to two-way adapter via the second communication path according to the relay agent address. The packet processing relay agent obtains the address configuration information from the two-way adapter for use in initializing the one-way adapter.

Brief Summary Text (64):

The link is established between the two-way adapter and the service provider via the second communication path in response to a user request to access the computer network.

Brief Summary Text (65):

The session initialization request packet is provided from the one-way adapter to the packet processing relay agent in response to a user request to access the computer network.

Brief Summary Text (70):

The address configuration information may be provided by the network address server according to a DHCP.

Brief Summary Text (71):

The method may include the further step of providing a confirmation message from the one-way adapter to the network address server via the packet processing relay agent, two-way adapter, and second communication path to confirm receipt of the address configuration information at the one-way adapter.

Detailed Description Text (14):

FIG. 1 illustrates a system architecture in accordance with the present invention. The architecture includes a MSO/cable operator's network 110, a client PC 120, which may be located at a user's home, an ISP phone network 140 (e.g., switching facility), and a computer network 150 such as the Internet. The MSO/cable operator's network 110 includes a MSO router 116 for communicating with the Internet 150, a cable network address server 114 for assigning DHCP address to different cable modems served by the network 110, and a broadband network hub 112 that provides data on an RF channel 118 to a population of cable modems. An IP decapsulator module 148 may also be associated with the cable operator's network 110.

Detailed Description Text (26):

FIG. 2 illustrates a protocol stack in accordance with the present invention. The stack 200, representing the protocol of the PC 120, includes user applications 210 (e.g., such as an Internet browser running on a PC), a transport driver layer 220, e.g., using TCP, a network drive layer 230, e.g., using IP, a data link layer 240, and a physical layer 250.

Detailed Description Text (27):

The data link layer 240 includes a phone modem driver 226, a PPRA 224, and a cable modem driver 222. The physical layer includes the phone modem 126 and cable modem 122. The PC receives data via the receive-only cable modem 122, and sends and receives data via the phone modem 126. For example, a user may enter a request at the user application layer 210 to view a web page at a web site on the Internet. In this case, processing flows from the user application layer 210, to the transport layer driver 220, to the network layer driver 230, to the cable modem driver, to the relay agent 224, to the phone modem driver 226, and finally to the phone modem 126. Note that the cable modem driver 222 sends the user request to the relay agent 224 instead of the cable modem 122. The phone modem 126 then uses the telephone link to forward a message to the phone network. The message is then routed to the appropriate Internet server based on its destination address.

Detailed Description Text (28):

The server 155 receives the request for the appropriate web page, typically according to the HTTP. The server 155 sends the requested information back to the PC 120 at the IP address associated with the cable modem adapter 122. Specifically, the requested information is sent to the MSO/cable operator's network, and is then sent over the RF channel 118 and received by the cable modem 222. Processing for this data flows from the cable modem 122, to the cable modem driver 222, to the network layer driver 230, to the transport layer driver 220, and finally to the user application layer 210, where it is processed by the browser and displayed on the PC's screen.

Detailed Description Text (31):

At this point, two-way communication with servers on the Internet is possible over the phone link. Next, the cable modem stack needs to be initialized. This means that the cable modem needs to obtain its IP address and network configuration information. Since the cable modem 122 is a oneway, receive-only adapter, this request for information is sent out through the phone modem adapter 126 using the PPRA 124.

Detailed Description Text (51):

FIG. 7 illustrates a process flow for initializing a two-way adapter such as a phone modem in accordance with the present invention. The initialization begins at block 700. At block 710, a user requests an Internet connection by clicking on a cable modem "connection software" icon, e.g., on the screen of the PC. The connection process includes two phases (e.g., initialization of the phone modem adapter, and of the cable modem adapter) and is controlled by a connection manager application of the PC.

Detailed Description Text (58):

At block 825, the DHCP server, e.g., the cable network address server, responds to the packet with IP address configuration information for the relay agent address. That is, the destination address of the response is the IP address of the phone adapter.

Detailed Description Text (62):

At block 855, the PPRA process the packet for DHCP relay agent functions. At block 860, the PPRA sends the packet to the cable modem stack. At block 865, the cable modem receives the IP address and configuration information. At block 870, the cable modem sends out another DHCP request to the cable network address server confirming that it received the information. The request is modified by the PPRA as per the original request (see blocks 810 and 815 in FIG. 8(a)).

Detailed Description Text (69):

The cable network address server responds to the packet with IP address and configuration information for the relay agent address. The phone modem receives the response from the cable modem address server and passes it to the cable modem stack via the PPRA to recover the IP address and configuration information. The cable modem is then initialized and ready to receive Internet data via a one-way RF channel.

CLAIMS:

1. A method for initializing a one-way adapter that receives data from a computer network via a first communication path, and communicates with a two-way adapter via a packet processing relay agent, wherein said two-way adapter is adapted to receive data from, and send data to, a service provider of said computer network via a second communication path, comprising the steps of:

establishing a link between said two-way adapter and said service provider via said second communication path;

obtaining an address from said service provider, and communicating said address to said packet processing relay agent via said second communication path and said two-way adapter;

providing a session initialization request packet from said one-way adapter to said packet processing relay agent;

said packet processing relay agent providing said session initialization request packet with: (a) a source address according to said address obtained from said service provider, and (b) a destination address of a network address server associated with said first communication path; and

communicating said session initialization request packet to said network address server via said two-way adapter and said second communication path according to said destination address thereof; wherein:

said network address server responds to said packet communicated thereto by communicating address configuration information to said two-way adapter via said second communication path; and

said packet processing relay agent obtains said address configuration information from said two-way adapter for use in providing initialization of said one-way adapter.

2. The method of claim 1, wherein:

said link is established between said two-way adapter and said service provider via said second communication path in response to a user request to access said computer network.

3. The method of claim 1, wherein:

said session initialization request packet is provided from said one-way adapter to said packet processing relay agent in response to a user request to access said computer network.

9. The method of claim 1, wherein:

said address configuration information is provided by said network address server according to a Dynamic Host Configuration Protocol.

10. The method of claim 1, comprising the further step of:

providing a confirmation message from said one-way adapter to said network address server via said packet processing relay agent, two-way adapter, and second communication path to confirm receipt of said address configuration information at said one-way adapter.

12. An apparatus for initializing a one-way adapter that receives data from a computer network via a first communication path, comprising:

a packet processing relay agent;

a two-way adapter that communicates with said one-way adapter via said packet processing relay agent;

said two-way adapter adapted to receive data from, and send data to, a service provider of said computer network via a second communication path;

means for establishing a link between said twoway adapter and said service provider via said second communication path;

means for obtaining an address from said service provider, and communicating said address to said packet processing relay agent via said second communication path and said two-way adapter; and

means for providing a session initialization request packet from said one-way adapter to said packet processing relay agent;

said packet processing relay agent providing said session initialization request packet with: (a) a source address according to said address obtained from said service provider, and (b) a destination address of a network address server associated with said first communication path; and

means for communicating said session initialization request packet to said network address server via said two-way adapter and said second communication path according to said destination address thereof; wherein:

said network address server responds to said packet communicated thereto by communicating address configuration information to said two-way adapter via said second communication path; and

said packet processing relay agent obtains said address configuration information from said two-way adapter for use in providing initialization of said one-way adapter.

13. The apparatus of claim 12, wherein:

said link is established between said two-way adapter and said service provider via said second communication path in response to a user request to access said computer network.

14. The apparatus of claim 12, wherein:

said session initialization request packet is provided from said one-way adapter to said packet processing relay agent in response to a user request to access said computer network..

20. The apparatus of claim 12, wherein:

said address configuration information is provided by said network address server according to a Dynamic Host Configuration Protocol.

21. The apparatus of claim 12, further comprising:

means for providing a confirmation message from said one-way adapter to said network address server via said packet processing relay agent, two-way adapter, and second communication path to confirm receipt of said address configuration information at said one-way adapter.

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KUAC	Draw D
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Term	Documents
CONFIGURATION	1023516
CONFIGURATIONS	356608
INFORMATION	768984
INFORMATIONS	5327
USER	568929
USERS	165484
(1 AND (CONFIGURATION ADJ1 INFORMATION) AND USER) .USPT.	1
(L1 AND (CONFIGURATION ADJ1 INFORMATION) AND USER) .USPT.	1

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